

Having described the invention the following is claimed:

1. A steering wheel comprising a rim portion, a spoke portion, and a foamed padding material adhered to at least one of said rim portion and said spoke portion, said foamed padding material including a first portion and a second portion, said first portion having cellular structure and a substantially uniform cell density, said second portion having a continuous external surface free of interruption by a cell, and said foamed padding material comprising a gasified chemical foaming agent and a thermoplastic polyolefin elastomer.

2. The steering wheel of claim 1, wherein the thermoplastic polyolefin elastomer is weatherable and has a durometer shore A hardness of about 30 to about 90.

3. The steering wheel of claim 1, wherein the thermoplastic polyolefin elastomer includes a thermoplastic polyolefin polymer selected from the group consisting of polyethylene, polypropylene, polybutylene, polyisobutylene, polyoctene, copolymers of polyethylene, polypropylene, and polybutylene, and mixtures thereof.

4. The steering wheel of claim 3, wherein the thermoplastic polyolefin polymer is an elastomer or non-elastomer material.

5. The steering wheel of claim 3, wherein the thermoplastic polyolefin elastomer further includes another thermoplastic elastomer or rubber.

6. The steering wheel of claim 1, wherein the thermoplastic polyolefin elastomer comprises a mixture of ethylene-propylene copolymer, ethylene-propylene-diene terpolymer, and polypropylene.

7. The steering wheel of claim 1 wherein the foamed padding material is plasticizer-free.

8. The steering wheel of claim 1, said chemical foaming agent comprises an exothermic chemical foaming agent, an endothermic chemical foaming agent, or a mixture thereof.

9. The steering wheel of claim 1, wherein the chemical foaming agent prior to being gasified is in the

form of a plurality of granules that are encapsulated with a resin carrier.

10. The steering wheel of claim 9, wherein the resin carrier is essentially the same material as the thermoplastic polyolefin elastomer.

11. The steering wheel of claim 1 wherein the foamed padding material further includes an additive selected from the group consisting of colorants, inorganic fillers, nucleating agents, and stabilizers.

12. A steering wheel comprising a rim portion, a spoke portion, and a plasticizer-free foamed padding material adhered to said rim portion and said spoke portion, said foamed padding material adhered to said rim portion having a first thickness and said foamed padding material adhered to said spoke portion having a second thickness different from said first thickness, said foamed padding material including a first portion and a second portion, said first portion having a cellular structure and a substantially uniform cell density, said second portion having a continuous external surface free of interruption by a cell, and said foamed padding material

comprising a gasified chemical foaming agent and a thermoplastic polyolefin elastomer.

13. The steering wheel of claim 12, wherein the thermoplastic polyolefin elastomer is weatherable and has a durometer shore A hardness of about 30 to about 90.

14. The steering wheel of claim 12, wherein the thermoplastic polyolefin elastomer comprises a mixture of ethylene-propylene copolymer, ethylene-propylene-diene terpolymer, and polypropylene.

15. The steering wheel of claim 12, wherein said chemical foaming agent comprises an exothermic chemical foaming agent, an endothermic chemical foaming agent, or a mixture thereof.

16. The steering wheel of claim 15, wherein the chemical foaming agent prior to being gasified is in the form of a plurality of granules that are encapsulated with a resin carrier.

17. The steering wheel of claim 16, wherein the resin carrier is essentially the same material as the thermoplastic polyolefin elastomer.

18. The steering wheel of claim 12 wherein the foamed padding material further includes an additive selected from the group consisting of colorants, inorganic fillers, nucleating agents, and stabilizers.

19. A method of manufacturing a foamed padding material for a steering wheel, said method comprising the steps of:

mixing a thermoplastic polyolefin elastomer and a chemical foaming agent;

foaming said thermoplastic polyolefin elastomer with said chemical foaming agent;

providing a steering wheel armature having a rim portion and a spoke portion; and

adhering said foamed thermoplastic polyolefin elastomer to said rim portion and said spoke portion of said steering wheel armature, said foamed thermoplastic polyolefin elastomer adhered to said rim portion and spoke portion of said steering wheel armature forming a foamed padding material including a first portion and a second

portion, said first portion having cellular structure and a substantially uniform cell density, said second portion having an external surface free of interruption by a cell.

20. The method of claim 19 wherein said foamed thermoplastic polyolefin elastomer is adhered to said rim portion and said spoke portion of said steering wheel armature by molding said foamed thermoplastic polyolefin elastomer to said rim portion and said spoke portion of said steering wheel armature.

21. The method of claim 19 wherein said thermoplastic polyolefin elastomer is foamed by heating said mixture of thermoplastic polyolefin elastomer and chemical foaming agent to a temperature above the melting temperature of said thermoplastic polyolefin elastomer.

22. The method of claim 19, wherein said thermoplastic polyolefin elastomer is weatherable and has a durometer shore A hardness of about 30 to about 90.

23. The method of claim 19, wherein the thermoplastic polyolefin elastomer comprises a mixture of

ethylene-propylene copolymer, ethylene-propylene-diene terpolymer, and polypropylene.

24. The method of claim 19, wherein said chemical foaming agent comprises an exothermic chemical foaming agent, an endothermic chemical foaming agent, or a mixture thereof.

25. The method of claim 24 wherein said chemical foaming agent is in the form of a plurality of granules that are encapsulated with a resin carrier.

26. The method of claim 25, wherein the resin carrier is essentially the same material as the thermoplastic polyolefin elastomer.

27. The method of claim 20, wherein said foamed thermoplastic polyolefin elastomer is molded to said steering wheel by injection molding.

28. The method of claim 19, wherein said foamed padding material is plasticizer-free.

29. A method of manufacturing a steering wheel, said method comprising the steps of:

mixing a thermoplastic polyolefin elastomer and a foaming agent;

heating the mixture of said thermoplastic polyolefin elastomer and said foaming agent to a temperature above the melting temperature of said thermoplastic polyolefin elastomer;

foaming said melted thermoplastic polyolefin elastomer with said foaming agent;

providing a mold having a first mold wall and a second mold wall, said first wall portion defining a first cavity in which a rim portion of a steering wheel armature is disposed, said second wall portion defining a second cavity in which a spoke portion said steering wheel armature is disposed;

maintaining the temperature of the first wall portion at a first temperature below the melting temperature of thermoplastic polyolefin elastomer;

maintaining the temperature of the second wall portion at a second temperature, said second temperature being substantially lower than said first temperature;



transferring said foamed thermoplastic polyolefin elastomer into said first cavity and said second cavity; and

cooling said foamed thermoplastic polyolefin elastomer to a temperature below the melting temperature of said thermoplastic polyolefin elastomer, said cooled thermoplastic polyolefin elastomer adhering to said rim portion and spoke portion of said steering wheel armature.

30. The method of claim 29, wherein said cooled foamed thermoplastic polyolefin elastomer forms a foamed padding material including a first portion and a second portion, said first portion having a cellular structure and a substantially uniform cell density, and said second portion having a continuous external surface free of interruption by a cell.

31. The method of claim 30, wherein said foamed padding material adhered to said rim portion of said steering wheel armature has a first thickness and said foamed padding material adhered to said spoke portion has a second thickness different from said first thickness.

32. The method of claim 31 wherein said second thickness is substantially greater than said first thickness.

33. The method of claim 29, wherein said thermoplastic polyolefin elastomer is weatherable and has a durometer shore A hardness of about 30 to about 90.

34. The method of claim 29, wherein the thermoplastic polyolefin elastomer comprises a mixture of ethylene-propylene copolymer, ethylene-propylene-diene terpolymer, and polypropylene.

35. The method of claim 29, wherein said foaming agent comprises an exothermic chemical foaming agent, an endothermic chemical foaming agent, or a mixture thereof.

36. The method of claim 35 wherein said foaming agent is in the form of a plurality of granules that are encapsulated with a resin carrier.

37. The method of claim 29, wherein said foamed padding material is plasticizer-free.